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C. COMPREHENSIVE PHYSICAL EXAMINATION

As with younger children, a complete physical examination that includes a minimum of five systems is required each year for all adolescents (Refer to Section 3, *Unclothed Physical Examination by Systems*). Additionally, the physical examination provides an excellent opportunity to educate the adolescent about his or her changing body. For example, the adolescent female may be taught to perform routine breast examinations, or the young adolescent male may be reassured about genital development. The adolescent may also raise concerns not mentioned during the initial interview. The true chief complaint may, in fact, be revealed during the physical examination.

The US Preventive Task Force recommends that a woman should have her first cervical cancer screening (Pap smear) at 21 years of age, no matter when she became sexually active. This recommendation is based in part on the very low incidence of invasive cancer and the potential for adverse effects of the follow-up of abnormal cytology screening results.[1]

Indications for pelvic examinations prior to age 21 are noted in the 2010 AAP statement "*Gynecologic Examination for Adolescents in the Pediatric Office Setting*".[2]

A provider may still wish to refer a sexually active adolescent for reproductive health services including contraception. The adolescent should be given the name of the provider and a referral for services. Coordination of such services remains the responsibility of the primary care provider.

Vision and Hearing Assessments

At least a gross assessment of hearing and vision is required as part of every adolescent preventive care visit. An objective testing is required at ages of 12, 15, and 18. Document results of a gross assessment based on provider observation and questioning of the adolescent's ability to see and hear. Objective vision and hearing results from the school can be documented in the medical record as a sufficient assessment (Refer to Section 3, *Hearing Assessment and Vision Assessment*).[3]

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[1] See U.S. Preventive Services Task Force. (2012). Cervical Cancer: Screening. Retrieved on 11/24/14, from *http://www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm*

[2] Gynecologic Examination for Adolescents in the Pediatric Office Setting. (2010). *Pediatrics*. 126 (3), 583-590. Retrieved on 09/05/2014, from *http://pediatrics.aappublications.org/content/126/3/583.full.html*

[3] Eye Examination in Infants, Children, and Young Adults by Pediatricians. (2007). *Pediatrics.*111 (4), 902-907. Retrieved on 09/04/2014, from *http://pediatrics.aappublications.org/content/111/4/902.full.pdf+html*

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Blood Pressure Measurements

The Maryland Healthy Kids Program requires assessment of blood pressure on the yearly adolescent visit with documentation in the medical record according to recommended standards (Refer to Section 3, *Blood Pressure Measurements*).[4]

For further guidance, refer to the 2004 *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents* at *http://www.nhlbi.nih.gov/files/docs/resources/heart/hbp_ped.pdf* and the 2011 *Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents* at *http://www.nhlbi.nih.gov/files/docs/peds_guidelines_sum.pdf*.

Height, Weight, and BMI Measurements

Early adolescence is a time of considerable change in body stature. Plotting weight and height for age allows comparison with all adolescents the same age and is the best initial indicator of growth problems. The use of Body Mass Index (BMI) is required to monitor changes in body weight and to consistently assess risk of underweight and obesity in children and adolescents from 2 to 20 years of age. Calculate BMI using the English or metric formula, or by using *BMI Percentile Calculator for Child and Teen* located at the following link: *http://nccd.cdc.gov/dnpabmi/*. Once BMI is calculated, plot the result on gender specific *BMI-for-Age Growth Charts*, available from the CDC, to determine the BMI-for-age and gender percentile (Refer to Section 7, Appendix I). It is important to review and interpret the results of the automatic BMI calculations provided by electronic medical records (EMR) or electronic health records (EHR) used in many practices today. Provider interpretation of results is paramount in identifying overweight and obese children and those at risk for obesity related complications.

How to Calculate Body Mass Index (BMI)

English Formula: **BMI = weight (lb) ÷[height (in)]^2 x 703**

Metric Formula: **BMI = weight (kg) ÷ [height (cm)]^2 x 10,000**

What do BMI-for-age and gender percentiles mean?

$\geq$99th percentile……"Morbid" Obesity

95th to 98th percentile……. Obesity

85th to 94th percentile……. Overweight

5th to 84th percentile……... Healthy weight

<5th percentile…… Underweight

[4] See *http://www.nhlbi.nih.gov/files/docs/bp_child_pocket.pdf*

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An excellent learning module on overweight and obesity in children and adolescents and the use and interpretation of the CDC growth charts can be found on the CDC web site: *http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html*

BMI-for-age and gender is an effective screening tool, but it is not a diagnostic tool. Adolescents who fall into the following categories need further assessment.

- If BMI is below fifth percentile, assess for acute or chronic illnesses that can lead to underweight.
- If BMI is between 85th and 94th percentiles, child is overweight and needs further screening.
- If BMI is at or above 95th percentile for age and sex, the child is obese and needs in-depth medical and dietary assessment according to current guidelines.[5]

Nutritional Assessment

As children enter adolescence, many of them become more independent with respect to food choices and food preparation. Adolescents spend less time at home; therefore, they eat more commercially prepared foods ("fast food"). Some adolescents will restrict their intake; still others will consume excessive amounts of food. As a result, many young people are at risk for health problems related to poor eating patterns such as eating disorders and obesity.

Ask questions regarding current dietary habits when taking the medical history. During the physical examination, take time to measure the patient's weight in an examination gown to standardize the measurements. Track height, weight, and Body Mass Index (BMI) longitudinally, in order to monitor trends over time. This is essential for the early identification of eating disorders and obesity.

During the nutritional assessment, the provider should ask open-ended questions that permit the adolescent and the parents to describe their current behaviors, their level of physical activity, and their attitudes about their weight and body appearance. Use the *Nutrition Questionnaire* (Refer to Section 7, Appendix II) as an opportunity to identify adolescents at risk for eating disorders and intervene early to prevent their onset.[6] Additional nutrition and physical activity assessment tools with guidelines for

[5] Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. (2007). *Pediatrics*. 120 (4) 164-192. Retrieved on 08/18/2014 from *http://pediatrics.aappublications.org/content/120/Supplement_4/S164.full?sid=96871aff-5e0c-4c9b-ad26-d97d2b61e47b*

[6] See *http://brightfutures.aap.org/Nutrition_3rd_Edition.html*

interpreting responses are also available on the *Bright Futures* web site at *http://www.brightfutures.org/physicalactivity*.

Nutritional Education

Provide all adolescents and their caregivers with anticipatory guidance on nutrition according to the age and developmental stage of the child. Guidance can include discussion of the following:

- Nutritional needs of adolescents
- Development of healthful eating and activity habits in school-age children and adolescents

Use the *Dietary Guidelines for Americans*[7] and the *My Plate*[8] as guides for children and adolescents to select healthy foods for meals and snacks (Refer to Section 7, Appendix IV). Further nutrition and physical activity education should include the following evidence-based messages for all children regardless of age:

- Limit sugar-sweetened beverages
- Fill half the plate with fruits and vegetables. Grains and proteins should each incorporate less than one quarter of the plate. Dairy should include fat-free or low fat milk or yogurt products.
- Eat breakfast every day
- Limit eating out, especially fast food
- Have regular family meals
- Limit portion sizes
- Engage in moderate to vigorous physical activity for at least 60 minutes a day
- Limit screen time to no more than 2 hours/day
- Remove television from children's bedrooms

[7] See *http://www.health.gov/dietaryguidelines/*

[8] See *http://www.choosemyplate.gov/*

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Obesity in Adolescence

Obesity is a pressing national health concern. Most children and adolescents who are overweight are at risk for becoming obese adults. Adolescence is a critical time to prevent the development of excess weight and reverse unhealthy weight gain. Work with adolescents to establish healthy behaviors, and undo or prevent negative behaviors before they become established. Adolescents with a genetic predisposition to gain weight are more likely to become overweight if they are sedentary and consumers of high-fat, high-calorie diets. Although some adolescents exercise, many do not. Obesity affects both the physical and mental health of the adolescent. Every overweight adolescent should have a thorough history and physical examination to rule out the less common causes of obesity. Simple nutritional recommendations from the primary care physician may be helpful or a nutritional consultation may be necessary. Contact the adolescent's MCO to refer to a licensed dietician or nutritionist within the MCO specialty network. For assistance in locating Medicaid enrolled nutritionists/dieticians who accept referrals for fee-for-service, contact the **Division of Children's Services** at **410-767-1903.**

Medical Management of Overweight and Obesity in Adolescents

The 2007 *Expert Committee Recommendations Regarding the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity* provide guidance on management of weight in all children.[9] **Primary care physicians are urged to implement Step 1, Obesity Prevention at Well Care Visits at least once a year**. Obesity prevention includes the following:

- Assess key dietary habits (e.g., consumption of sweetened beverages)
- Assess physical activity habits
- Assess readiness to change lifestyle habits
- Conduct a focused family history of obesity and obesity-related illnesses

Laboratory testing recommendations depend on the degree of obesity and associated risk factors as follows:

- Adolescents with a body mass index between the 85th and 94th percentiles, but who have no obesity-related risk factors should receive a fasting lipid profile blood test
- Adolescents 10 years of age or older who have a body mass index between the 85th and 94th percentiles with obesity-related risk factors should have additional testing for liver function (ALT and AST) and fasting blood glucose

[9] Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. (2007). *Pediatrics*. 120 (4) 164-192. Retrieved on 08/18/2014 from *http://pediatrics.aappublications.org/content/120/Supplement_4/S164.full?sid=96871aff-5e0c-4c9b-ad26-d97d2b61e47b*

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- Adolescents 10 years of age or older with a BMI above the 95th percentile should also have measurement of blood urea nitrogen and creatinine levels

A four-stage approach to treatment of childhood obesity is recommended and includes advising parents and adolescents to:

- Limit consumption of sweetened beverages and fast food
- Limit the amount of screen time (TV and Computers) per day
- Increase physical activity for at least 60 minutes per day
- Eat family meals on most, and preferably all, days of the week

For more details, refer to the *Implementation Guide from the Childhood Obesity Action Network* (Refer to Section 3, Addendum). It combines key aspects of the 2007 Expert Commission Recommendations and 2006 practice tools identified by the *National Institute for Children's Health Quality*.[10]

Additional information on these recommendations can be found at:

- The First Lady *Let's Move* initiative at *http://www.letsmove.gov/*
- *National Institute for Children's Heatlh Quality* at *www.nichq.org*
- CDC web page on *Obesity and Overweight: Strategies and Solutions* at *http://www.cdc.gov/obesity/childhood/solutions.html*
- The National Institutes of Health *We Can* campaign at *http://www.nhlbi.nih.gov/health/educational/wecan/*.

Type 2 Diabetes Mellitus

Another emerging health issue is the growing number of adolescents and preadolescents with Type 2 Diabetes Mellitus (T2DM). As the prevalence of obesity increases, so does the incidence and prevalence of T2DM. Most adolescents with T2DM have a BMI over the 85th percentile. Many adolescents with T2DM may present with asymptomatic hyperglycemia or glycosuria. Adolescents with T2DM are usually diagnosed in middle to late adolescence. Overweight adolescents who do not develop diabetes in adolescence may develop it later as adults.

The American Diabetes Association recommends a fasting glucose test every three years for children starting at 10 years of age or at onset of puberty if puberty occurs earlier, and who have two of the following risk factors:

- Are overweight (BMI > 85th percentile for age and sex),
- Have a family history of T2DM in first and second degree relatives, or

[10] See *http://www.nichq.org/*

- Belong to certain ethnic groups (American Indians, African-Americans, Hispanic Americans, Asian/South Pacific Islanders)

- Have signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovarian syndrome, or small-for-gestational-age birth weight)

- Have maternal history of diabetes or GDM during the child's gestation. [11]

For the treatment of T2DM in children and adolescents, refer to *2013 AAP Guidelines on the Management of Newly Diagnosed Type 2 Diabetes Mellitus (T2DM) in Children and Adolescents*.[12]

[11] American Diabetes Association. Standards of medical care in diabetes--2014. (2014). *Diabetes Care.* 37(1), 14-80. Retrieved on 11/14/2014, from *http://care.diabetesjournals.org/content/37/Supplement_1/S14.full.pdf+html*

[12] American Academy of Pediatrics. 2013 AAP Guidelines on the Management of Newly Diagnosed Type 2 Diabetes Mellitus (T2DM) in Children and Adolescents. (2013). *Pediatrics. 131,* 364-382. Retrieved on 11/14/2014, from *http://pediatrics.aappublications.org/content/early/2013/01/23/peds.2012-3494.full.pdf+html*